

## PRELIMINARY PRODUCT INFORMATION

### LCRB001D PRODUCT FEATURES



- Point level detection with corTEC® capacitive sensor technology for highest accuracy and reliability
- Compact PCBA with small dimensions suitable for various casings and smallest housings
- Excellent sensitivity and accuracy even with media of the lowest dielectric constants (even  $\epsilon_r < 2$ )
- corTEC® sensors offer periodic autocalibration during operation and are immune to almost any interference and compensate artifacts
- Easy communication with I<sup>2</sup>C, various option on request

#### Custom Features<sup>1</sup>

- High electromagnetic compatibility for different industries
- Indication of different states through multi-colour LED's
- Switching point adjustment / teaching possible (IO-Link, magnet, and others)

### PRODUCT DESCRIPTION

The LCRB001D standard electronics are designed to allow easy integration in process industry sensors and general industry measurement devices. I<sup>2</sup>C and other outputs allow for easy communication due to its simplicity and flexibility. The slim design caters to various OEM housing needs, fitting into compact spaces. EBE's corTEC® measurement technology can detect a vast range of materials like powders, liquids, and high viscosity substances even with the lowest dielectric constants of  $\epsilon_r < 2$ . The advanced electronics perform automatic calibration during operation, ensuring precise and efficient functionality over long periods of time. The LCRB001D electronics are REACH/RoHS compliant (EU). For UL compliance please contact EBE.

#### Customizations

EBE can design level sensors according to the specific requirements and characteristics of the customer's application. The corTEC®'s measurement technology enables precise adaptation to confined spaces and difficult conditions. EBE's engineers support level switch electronics applications

<sup>1</sup> Incorporating such feature(s) is part of custom specific projects

including IO-Link or EMC specific requirements for a plug and play integration into custom sensor housings.

### Level Sensor Evaluation Kit – Quick Introduction to Applications

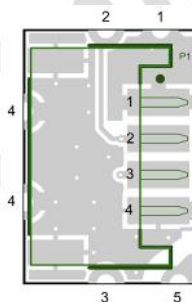
EBE offers a level sensor evaluation kit for immediate readiness for use. The data is transmitted via adapter box to the PC. This allows customers to test the performance of the level sensors in their own applications. The download link for the associated EBE Sensor Control Software can be found at <https://www.ebe.de/download-center/>.

## LCRB001D PRODUCT SPECIFICATIONS

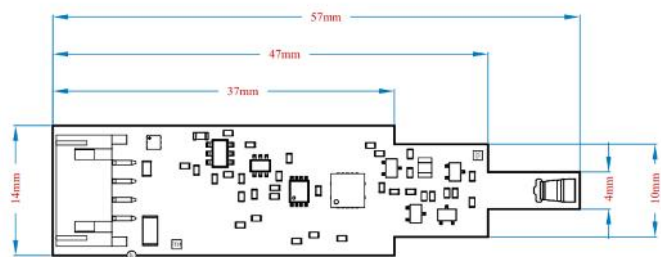
### TECHNICAL DATA

MEASURING RANGE	0...30 pF
MEASUREMENT TYPE	corTEC®
MOUNTING POSITION	any: top, bottom, side
ACCURACY	typ. $\pm 1$ mm (depending on application setting) <sup>2</sup>
CONNECTOR	solder pads or direct assembly on PCBA
POWER SUPPLY	5 VDC, 40 mA max.
OUTPUT	I <sup>2</sup> C (serial, IO-Link and switching outputs on request)
OPERATING TEMPERATURE RANGE	-25 °C to +85 °C (extended range on request)
STORAGE TEMPERATURE	-40 °C to +85 °C
HUMIDITY	0- 95% r.H., non-condensing

## OUTLINE DRAWING / PINNING



Pin	
1	+5V DC
2	I <sup>2</sup> C SDA
3	I <sup>2</sup> C SCL
4	Ground
5	Ground to metal housing (option)



<sup>2</sup> Sensor measures capacity. Accuracy in mm is a function of number of parameters which will influence the measurement. Please contact EBE for further information.

## APPLICATION EXAMPLES

### APPLICATION EXAMPLE OF PROCESS INDUSTRY LEVEL SWITCHES

THE FOLLOWING OUTLINES IS AN EXAMPLE OF A LEVEL SENSOR/SWITCH WHICH MAY BE DESIGNED BASED ON LCRB001D POINT LEVEL SENSOR ELECTRONICS. EBE DOES NOT PROVIDE THIS PRODUCT NOR WARRANTS ANY SPECIFICATION OF SUCH FINAL PRODUCTS.



#### POINT LEVEL DETECTION IN THE HYGIENE SECTOR

- Complies with 3-A, FDA and EHEDG standards
- Detects/ignores foam
- Easily solves media adhesion problems
- 2 adjustable switching outputs
- 360° visible multi-coloured LED alarms
- IO-Link interface

#### PERFORMANCE - EXAMPLE

MEDIA CHARACTERISTICS	DC > 1
HYSTERESIS	± 1 mm
REPEATABILITY	± 1 mm
STEP RESPONSE TIME (10 ... 90%)	typ. 150 ms
DAMPING	0 ... 10 s , adjustable

#### PROCESS CONNECTIONS - EXAMPLE

WETTED PART MATERIAL	PEEK Natura, AISI 316L (1.4404)
SURFACE ROUGHNESS WETTED PARTS	Ra ≤ 0.8 µm

#### OUTPUT SIGNALS - EXAMPLE

OUTPUT TYPE	PNP, NPN, Switching (Push-Pull), 4...20 mA
SWITCHING LOGIC	normally open (NO), normally closed (NC)

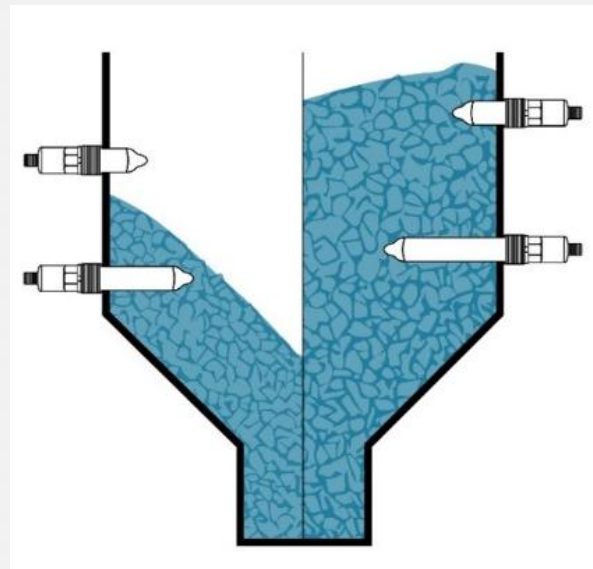
#### CERTIFICATIONS - EXAMPLE

EMC EMISSION	EN 61326-1, EN 50121-3-2:2016
EMC IMMUNITY	EN 61326-1, EN 50121-3-2:2016
HYGIENE	3-A, EHEDG EL I CLASS, FDA
SAFTEY	cULus listed, E365692

**APPLICATION EXAMPLES (Continued)**

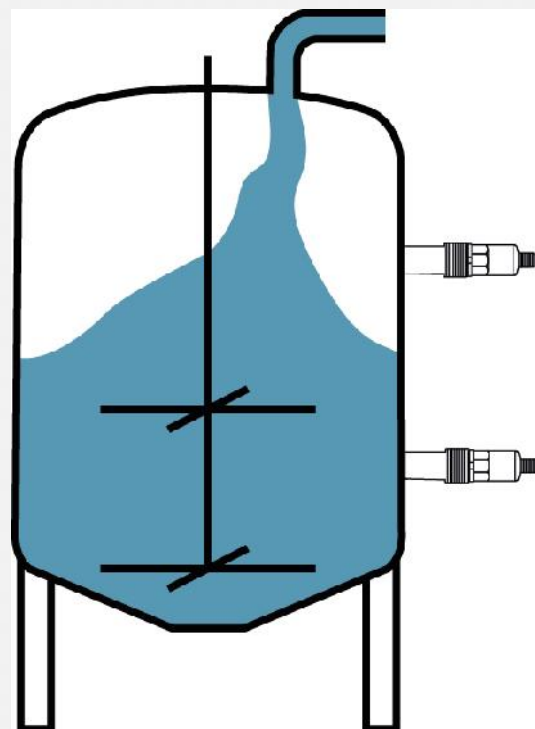
**SOLIDS LEVEL MEASUREMENT**

Fields of application in level measurement with special challenges are processes with bulk materials, granulates or powdery substances. These are often environments with large amounts of dust, in which fill levels in closed containers must also be measured reliably. However, many measurement principles are not possible due to dust and mechanical stress. EBE's corTEC® measurement method is able to detect media with low dielectric constants and can be placed in rugged housings.



**VISCOSE MEDIA LEVEL MEASUREMENT**

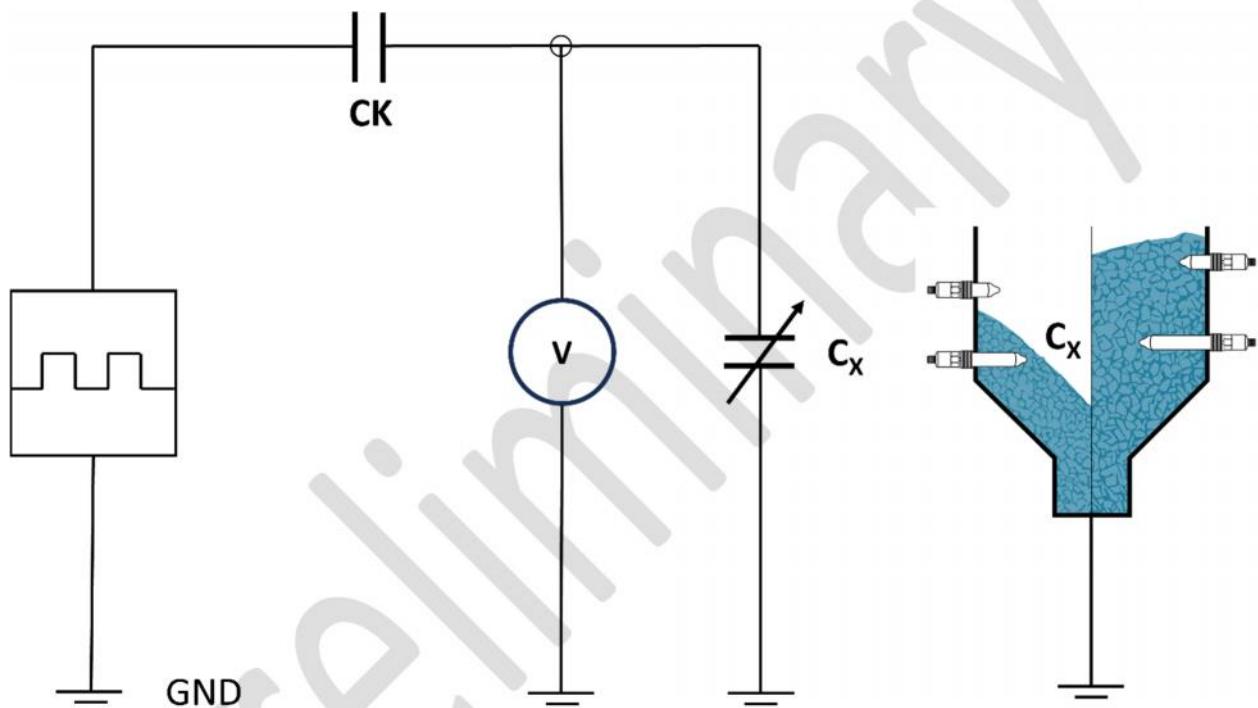
In the food industry, for example, products such as dairy products, nut nougat creams or jams go through a series of process steps using pipes, tanks and mixing containers. The constant, precise measurement and monitoring of fill levels is crucial for ensuring product quality and consistency. However, the measuring instruments will be covered by the media even so the tank level is below the sensor. EBE's corTEC® can distinguish between a liquid level and only media covering the sensor.



## TECHNOLOGY INFORMATION

### WORKING PRINCIPLE corTEC® (Patent Pending)

The LCRB001D level sensor electronics is a printed circuit board with various components (PCBA) such as resistors, capacitors, transistors, diodes and ICs. Its structure is defined by EBE's corTEC® measuring technology. To understand the function, it is necessary to look at a simplified block diagram.



The figure shows the basic circuit diagram of the level sensor module LCRB001D. From an electrotechnical point of view, it is the schematic of a capacitive voltage divider that contains a signal source  $Q$ , a coupling capacitor  $CK$  and a variable capacitor  $C_x$ , which represents the measuring electrode and the permittivity of the medium. The capacitance  $C_x$  represents the medium whose presence or absence is to be detected. The capacitance  $C_x$  is measured at different frequencies.

The entire electronics can be installed in both metallic and non-metallic containers. The measured capacitance is formed between the sensor tip through the medium to the container wall.

The best sensor performance can be achieved in a metal container due to the closed circuit of the electric field. To suppress environmental effects, an auto-calibration sequence is continuously triggered to compensate and stabilize the measured values.

## DISCLAIMER

Preliminary Product Information – please refer only to final product specifications

The information contained in this document is for general guidance only. The user is responsible for determining the suitability of the technical information referred to herein for his application. On delivery of the component, EBE is only obliged to implement those properties set out and agreed upon in this technical data sheet. Further properties are not included. No guarantee is given. The component has been designed for installation in our customer's products. Manufacturer of the resulting product and consequent liability according to the Product Liability Act lies with the customer.